



Madison County EMS



EZ-IO Guideline

This guideline is intended to be used as a supplement to the standard Madison EMS medical protocols. The EZ-IO may be attempted only on the critically ill or injured adult patient when IV fluids and/or medications must be immediately administered to prevent the patient's death. It is not to be used when routine IV access is unsuccessful or difficult to establish, unless it is ordered by a medical command physician.

Indications: Adult patients (Greater than 35 kg or 16 years of age) who:

1. Need IV fluids or medications and a peripheral IV cannot be established in 2 attempts or 90 seconds **AND** exhibit 1 or more of the following:
 - a. An altered mental status (GCS of 8 or less)
 - b. Respiratory compromise ($SpO_2 < 80\%$ after appropriate oxygen therapy, respiratory rate $< 10/\text{min}$ or $> 40/\text{min}$)
 - c. Hemodynamic instability (Systolic BP $< 90\text{mmHg}$)
2. EZ-IO may be considered PRIOR to peripheral IV attempts in the following situations:
 - a. Cardiac arrest (medical or traumatic)
 - b. Profound hypovolemia with or without alteration of mental status

Contraindications:

1. Fracture of the tibia or femur (consider alternate tibia)
2. Previous orthopedic procedures (IO within 24 hours, knee replacement)
3. Pre-existing medical condition involving that extremity
4. Infection at insertion site (consider alternate tibia)
5. Inability to locate landmarks (significant edema)
6. Excessive tissue at insertion site (obesity)

Considerations:

1. Flow rates:
 - a. Due to the anatomy of the intraosseous space, flow rates will be slower than those achieved with IV catheters.
 - b. Initially infuse a rapid bolus of 10mL of normal saline.
 - c. Use a pressure bag to ensure continuous infusion.
2. Pain:
 - a. Insertion of the EZ-IO in conscious patients causes mild to moderate discomfort but is usually no more painful than a large bore IV
 - b. IO infusion can cause severe discomfort for conscious patients. Consider nitrous oxide

Procedure:

1. Wear approved body substance isolation.
2. Locate and cleanse insertion site using aseptic technique.
 - a. **Adult Tibial insertion site:** Extend leg, locate tibial tuberosity by feeling the anterior surface of the tibia approximately 2 finger widths down from the patella. Move 1 finger-width medially from the tibial tuberosity: this is the tibial insertion site.
 - b. **Adult Humeral insertion site:** Expose the shoulder and place the patient's arm against the patient's body, resting the elbow on the stretcher or ground and the forearm resting on the abdomen. Note the humeral head on the anterior-superior aspect of the upper arm, or the anterior-lateral shoulder. Palpate and identify the mid-shaft humerus and continue palpating toward the proximal end (humeral head). Near the shoulder feel for the small protrusion, this is the base of the greater tubercle and the insertion site. With the opposite hand, pinch the



Madison County EMS



EZ-IO Guideline

anterior and inferior aspects of the humeral head, while confirming the identification of the greater tubercle. This will help ensure that you have located the midline of the humerus.

3. Prepare the EZ-IO driver and needle set.
4. Stabilize extremity.
5. Insert EZ-IO needle set.
6. Remove EZ-IO driver from needle set while stabilizing catheter hub.
7. Remove stylet from needle set and dispose in sharps container.
8. Confirm placement by aspiration of marrow and bolus of 10ml of normal saline.
9. Connect the IV tubing, stabilize with kling on either side and tape down.
10. Place a pressure bag on solution being infused and adjust the flow rate, as desired.
11. Monitor EZ-IO site and patient condition.
12. Ensure receiving hospital is aware of EZ-IO placement with ID bracelet and the ease of device removal.